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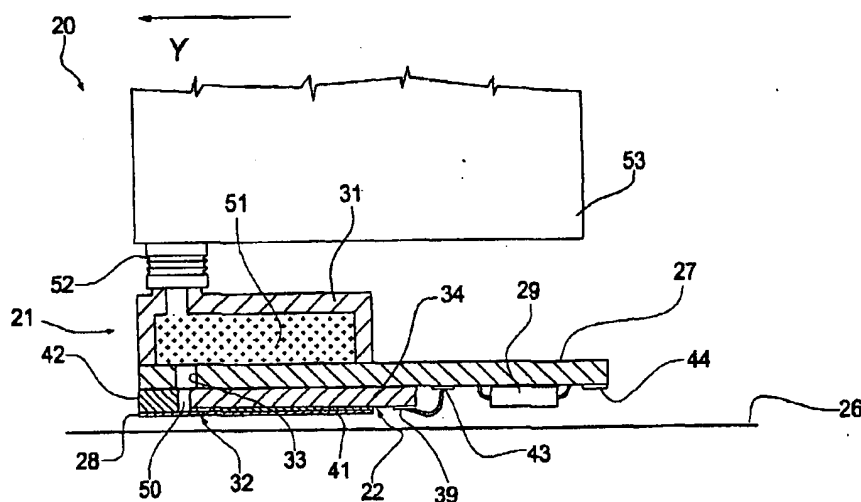
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  - *of inventorship (Rule 4.17(iv)) for US only*
- Published:**
- *with international search report*
  - *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

[Continued on next page]

(54) Title: **PARALLEL INK JET PRINTING DEVICE AND MANUFACTURING PROCESS**



(57) Abstract: The printing device (21) is ink jet, parallel or serial-parallel type and comprises a plurality of ejection modules (22) each of which with ejection chambers suitable for containing ink and with associated relative heating elements (24) for ink ejection control. The device includes a support and a nozzle plate (28) common to the modules (22), and in which the support includes a base plate (27) of rigid material that defines through its thickness a feeding duct (33) for the ink which, in use, is substantially parallel to the line of printing (X axis) and the ejection modules (22) are fixed side by side on the base plate (27) and with the ejection chambers arranged in a line in the same direction (X axis), is a hydraulic, tight connection with the feeding duct (33). The nozzle plate (28) is fixed on the ejection modules (22) constituting an upper, hydraulically tight, closing surface, for the chambers (23) and comprises a plurality of ejection nozzles (32) in a line, in turn in hydraulic connection with corresponding cells of the modules (22).



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## INTERNATIONAL SEARCH REPORT

International Application No

/IT 03/00607

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B41J2/14 B41J2/145 B41J2/16 B41J2/155 B41J2/165

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B41J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|------------|---|-----------------------|
| X          | US 6 068 367 A (FABBRI FRANCO)<br>30 May 2000 (2000-05-30)  | 14,15                 |
| A          | column 4, line 38 -column 5, line 23;<br>figures 2,3  | 1-13,16,<br>20        |
| A          | EP 0 666 174 A (HEWLETT PACKARD CO)<br>9 August 1995 (1995-08-09)<br>the whole document   | 1-13,16,<br>20        |
| A          | US 2002/008731 A1 (MATSUMOTO NOBUO ET AL)<br>24 January 2002 (2002-01-24)<br>page 3, paragraph 48 -page 4, paragraph<br>59; figures 1,2 | 1-13,16,<br>20        |
| A          | EP 0 677 387 A (CANON KK)<br>18 October 1995 (1995-10-18)<br>the whole document   | 1-13,16,<br>20        |
|            | ---<br>-/--   |                       |

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

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- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
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\*G\* document member of the same patent family

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## INTERNATIONAL SEARCH REPORT

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
|------------|--|-----------------------|
| X          | EP 0 816 085 A (CANON KK)<br>7 January 1998 (1998-01-07)<br>page 5, column 8 -page 10, column 29;<br>figures 1,3,12,15<br>----           | 14,15                 |
| A          | US 5 896 146 A (FUKUI HIROSHI ET AL)<br>20 April 1999 (1999-04-20)<br>the whole document<br>----   | 14,15                 |
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| X          | US 6 155 669 A (DONAHUE FREDERICK A ET AL)<br>5 December 2000 (2000-12-05)<br>column 3, line 42 -column 4, line 52;<br>figure 1<br>----- | 17-19                 |

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IT 03/00607

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-13, 16, 20

An ink jet printing device/a manufacturing process for producing an ink jet printing device wherein a base plate with an ink feeding duct is provided. The ejection modules are mounted on the plate in hydraulic connection with the feeding duct. The feeding duct goes through the thickness of the plate. Hydraulic tight means are provided for sealing the connection between the modules and the ink duct.

2. Claims: 14, 15

An ink jet printing device comprising a cartridge/s of ink which are removably connected to the ejection modules, the ejection modules being capable of a relative alternating motion in relation to the print medium for a printing resolution greater than the physical resolution of the pitch between the nozzles.

3. Claim : 17

A printer wherein one or more plugs are provided, capable of movement for sealing the nozzles of the head/s when printing is concluded.

4. Claims: 18,19

A printer comprising a bin for a series of paper cards and a skimming and feeding mechanism for skimming the paper cards from the bin and bringing them to a working configuration for the head/s.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

/IT 03/00607

| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
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